

METHOD OF REDUCING ELECTROMIGRATION
BY FORMING AN ELECTROPLATED COPPER-ZINC INTERCONNECT AND
A SEMICONDUCTOR DEVICE THEREBY FORMED

ABSTRACT OF THE DISCLOSURE

A method of reducing electromigration in a dual-inlaid copper interconnect line (3) by filling a via (6) with a Cu-rich Cu-Zn alloy (30) electroplated on a Cu surface (20) from a stable chemical solution, and by controlling the Zn-doping thereof, which also improves interconnect reliability and corrosion resistance, and a semiconductor device thereby formed. The method involves using a reduced-oxygen Cu-Zn alloy as fill (30) for the via (6) in forming the dual-inlaid interconnect structure (35). The alloy fill (30) is formed by electroplating the Cu surface (20) in a unique chemical solution containing salts of Zn and Cu, their complexing agents, a pH adjuster, and surfactants, thereby electroplating the fill (30) on the Cu surface (20); and annealing the electroplated Cu-Zn alloy fill (30); and planarizing the Cu-Zn alloy fill (30), thereby forming the dual-inlaid copper interconnect line (35).